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Cutting Tool Refinements Improve Production Levels, Tool Life an

Todayâ€™s mold manufacturers are looking for longer tool life, reduced cutting tool costs and increased production levels. Common challenges to these goals include the need to hold tighter tolerances, increase throughput and productivity, maintain good finishes, reduce time to complete a part and decrease rework.

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Following is a general overview of a variety of cutting tool technology developments, including advancements in coatings, tool geometry, design, edge preparation, hard milling and optimized roughing.

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The machining of molds and dies in a hardened state (from 48 to 70 HRC) along with tighter tolerancing of workpieces provides more flexibility for the moldmaker. Similarly, there is a trend in R&D for newer insert grades and coating technology advancements, which affects the mold builder, designer and process as they relate to the ability to both rough and finish the mold completely in the hard state.

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Dynamic milling is an optimized roughing approach that combines large cutting depths with relatively small radial engagement when cutting steel up to 60 Rockwell and harder. Peel milling is another name for this method.

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On a related note, as more shops consider dynamic milling, some software companies have added techniques for this process in their programming software. With the required CAM programming, dynamic milling can increase removal rates by up to 300 percent when compared with traditional methods.

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Another significant move seen by Sandvik Coromant continues to be to lightweight, high-speed machining, which offers lighter, faster machining and techniques that effectively use the abilities of machine tools today.

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Other trends observed in the mold market include refinements of tool geometry, design, coatings and edge preparation as manufacturers continually modify and improve designs to maximize tool performance.

The use of diamond-coated carbide tools continues to expand, with PVD-DLC diamond coatings offering excellent value and performance.

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Toolmakers are also looking to improve tool performance through surface finish improvement and edge preps/hones. Micro-blast, lapping and brush hones reduce the coefficient of friction on the cutting surfaces and also improve edge integrity. The results are finer workpiece finishes and extended tool life.

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To sum up, there are several key things that cutting tool manufacturers continually redevelop and reengineer. They are unique insert geometries, carbide substrates, cutting edge preparations (example hones) and high-tech coatings.

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Vendor Information